QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Physiological Researches on the Excretion of Urea by the Kidneys.*—MM. Prevost and Dumas, Claude Bernard, Ricord, and other physiologists, maintain that urea after having been generated in the blood and tissues is simply excreted by the kidneys, while M. Hermann asserts that urea and uric acid are not only eliminated, but are formed by the renal tissue. M. **Gréhant** has undertaken a series of experiments, which occupied some years, to decide between these conflicting opinions. As a preliminary to this inquiry it was necessary to discover an accurate quantitative test of the amount of urea contained in any liquid; and the present essay of M. Gréhant is devoted to this subject. M. Millon's test for urea consists of a solution of nitrous acid, obtained by adding nitric acid to a globule of mercury in a test-tube. The metal is attacked, and the nitrous acid produced remains dissolved in the acid; this fluid decomposes urea into carbonic acid and nitrogen, and the amount of the former produced, as shown by the increase in weight of a solution of potash, gives the amount of urea present. This process has been much improved and rendered far more accurate by M. Gréhant, by collecting not only the carbonic acid, but the nitrogen, by means of an air-pump; and by a comparison of the volumes of each gas demonstrating that the urea alone has undergone decomposition. He has ascertained that a cubic centimetre of nitrogen and of carbonic acid at 0° C., at normal pressure, represents exactly 2.683 milligrammes of pure urea. In order to obtain the amount of urea in the blood, it is requisite to make an alcoholic extract of 25 grammes only, and to redissolve in water the product of the evaporation of this fluid. The results of his inquiries, pursued with the aid of this new method, show that, immediately after nephrotomy in the fasting dog, urea begins to accumulate in the blood, its increase being manifest within three hours after the operation; that the increase of weight of the urea in the blood and in the lymph, twenty-four hours after the ablation of the kidneys, is equal to the weight of it that would have been excreted by the healthy fasting animal in the same space of time; that the accumulation of urea in the blood, in the hours that succeed nephrotomy, follows the same march as after ligature of the ureters; that after ligature of one ureter the quantity of blood circulating through the kidney of the side tied diminishes; that, under normal conditions, the blood of the renal vein always contains less urea than the corresponding artery; that, in an animal in which the ureters have been ligatured, the renal venous blood obtained twenty-four hours after the operation contains as much urea as the renal arterial blood, so that the tissue of the kidney neither excretes nor secretes any more. Lastly, he shows that ligature of the ureters and nephrotomy are two operations that are identical in their re-

sults: they both suppress the eliminative function of the kidneys, whilst they form no obstacle to the formation of urea, which takes place *outside* these organs.—*Archives de Physiologie Normale et Pathologique,* Sept. and Nov. 1870.

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2. *On the Significance of the Liver-fat, and of the Fatty Liver for the Healthy and Diseased Body.* By Dr. OSWALD NAUMANN.—The author of this paper has already pointed out in another place that the fat obtained from the liver is much more readily absorbed by the skin than other fat; it is as much as from four to seven times more readily absorbed. The liver-fat is further much more easily assimilated by the intestines, and also very much more oxidizable. These facts are intimately connected with the long-established therapeutic value of liver oil. In the present paper he lays down as a fundamental proposition, that in all the cases which he has examined the fat from the liver was much easier oxidized than that from other parts of the body, as the heart, the kidney, and the subcutaneous adipose tissue; and with this view he has examined the liver of fishes, pigs, ducks, the fatty liver after phosphorus-poisoning, the fatty liver in tuberculosis, and the pathological fatty liver in ducks. His method of testing the degree of oxidizability was by shaking the oil obtained in a test-tube, with a dilute solution of permanganate of potash, the degree of the decolorization of the fluid indicating the degree of oxidization. From the universality of this fact, the author deduces that one great function of the liver is to prepare for the organism an easily assimilable—that is to say, an easily oxidizable—fat; and that it does this chiefly by producing some unknown alteration of ordinary fat, but may also in part produce fat from albuminous principles. Taking another view of the question, the deduction is confirmed by the fact that, as a general rule, in the various classes of animals, the size and activity of the liver, but especially its proportion of fat, is in inverse proportion to the perfection of the function of respiration. Thus, in fishes the liver is unusually large; in birds proportionally very small. Then, again, the liver is formed very early in the embryo, and all through fœtal life the greater part of the blood passing into the fœtus passes through the liver before entering the general circulation, whereas, after birth, when the respiratory organs come into action, the absorbed fat passes in the form of chyle through the ductus thoracicus into the circulation without being first sent through the liver. The liver in fishes and amphibiæ, as well as in the embryo of higher animals, is therefore to be looked on as to some extent an accessory organ to the organs of respiration. And now in respect to the pathological fatty liver. It has been already stated that in it the fat presents the same peculiarity as in the normal liver, and the author regards the change as rather a physiological than a pathological one. The object of the increase in size and in the production of fat in the liver is to supply to the diseased organism readily assimilable fat, so that the large fatty liver has for the patient a similar significance as the normal liver has for the sound person. In the case of phthisis pulmonalis, which gives us the most frequent examples of fatty liver, it is easy to understand how the large fatty liver should act as in fishes and the fœtus, as an accessory organ to the partially disabled lungs. But in the other class of cases where the lungs are not affected, but where, as in chronic emaciating diseases, the activity of the functions in general is diminished, it is easy to understand how a supply of easily oxidizable matter would be a great desideratum to the weakened organism. The fact is thus explained how it happens that in the case of fatty liver the subcutaneous adipose tissue is generally deficient, the cause being that the fat is absorbed, but cannot be used till modified by the liver, which organ at a given time contains a large amount undergoing this process of modification. There is only one exception to this view, that, namely, of the fatty liver of the drunkard, where the fat is stored up in the liver, its place being in great part taken up by the easily oxidizable alcohols. In all the other cases the fatty liver is not a depot for the fat of the body, as it has been generally considered, but an active agent modifying the fat which it contains.—*Glasgow Medical Journal,* August, 1871, from *Reichert and Du Bois-Reymond's Archiv f. Anat. Phys., &c.,* No. 1, 1871.